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PCB MANAGEMENT PROGRAM MANUAL AND GUIDE

1. Purpose: The purpose of this manual is to set forth the procedures required during the design and construction of projects that have (or may have) items of electrical equipment that contain polychlorinated biphenyls (PCBs). The guides contained herein provide information necessary to generate project specification requirements based upon different PCB conditions.
2. Applicability. This pamphlet applies to all elements of the Sacramento District involved in the management, design, construction, or operation of projects that have, or may have, items of electrical equipment that contain PCBs.
3. References: Code of Federal Regulations (40 CFR 761).

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PCB MANAGEMENT PROGRAM MANUAL and GUIDE

1. General.

This publication prescribes the general procedures and instructions in identifying, handling and disposal of polychlorinated biphenyls (PCBs). This guide does not preempt the Code of Federal Regulations (40 CFR 761) or other more stringent Federal or local statutes and regulations. It is prudent to consult the latest Federal, State and local government requirements in the handling of PCBs. If further clarification or references are needed, the 40 CFR 761 should be consulted (located in CESPK-OC.)

2. PCB characteristics.

a. Background.

The term polychlorinated biphenyls designates a group of 209 synthetic chlorinated organic compounds introduced in 1929 by Swann Chemicals. Swann Chemicals was purchased by the Monsanto Company in 1935. In October, 1977, Monsanto Chemical Company, the sole producer, voluntarily ceased production of PCBs. There are dozens of trade names used for PCB products (see attachment #1), the most common are Aroclor, Inerteen and Pyranol. In the electrical industry, PCBs are often collectively referred to as "Askarels". PCBs have been extensively used in large high/low voltage capacitors, transformers, oil circuit breakers, reclosers, high intensity discharge lamp ballasts, fluorescent ballasts, oil switches and sectionalizers. Other industrial uses of PCBs include fluids for heat transfer equipment and hydraulic systems, gas turbines, and vacuum pumps, fire retardants, plasticizers in adhesive textiles, surface coatings, sealants, and in inks for printing and carbonless copy paper.

The manufacture, processing, and distribution of PCBs at concentrations of 50 parts per million (ppm) or greater and PCB items with concentrations of 500 ppm or greater present unreasonable risks to health and

the environment.

Experimental tests on animals indicate that PCBs can have adverse ecological and toxicological effects. It has been shown that PCBs, like mercury and arsenic, tend to accumulate to levels harmful to living organisms.

The adverse physiological effects of PCBs on living organisms and their tendency towards bioaccumulation resulted in enactment of the Toxic Substances Control Act (TSCA) of 1976 and EPA establishment of 40 CFR 761.

40 CFR part 761 establishes prohibitions and requirements for the manufacturing, processing, distribution in commerce, use, disposal, storage, and the marking of PCBs and PCB items. TSCA called for a ban on the use, manufacture, and distribution of PCBs by 1980, except for totally enclosed, authorized, or exempted uses granted by Environmental Protection Agency (EPA).

b. Characteristics of PCBs.

Askarel is the most common name used in the electrical industry to describe a class of nonflammable, synthetic, chlorinated, hydrocarbon insulating liquid. It is composed of PCBs mixed with chlorobenzenes to produce different blends for electrical manufacturers.

General characteristics of askarel:

- (1) Heavier than water.
- (2) Higher dielectric strength than mineral oil.
- (3) Nonflammable.
- (4) Nonexplosive.
- (5) Not susceptible to deterioration by oxidation.
- (6) Lower coefficient of expansion than mineral oil.
- (7) Will dissolve some insulating materials and paints.
- (8) At normal temperatures, viscosity is almost like mineral oil.
- (9) Dielectric strength is reduced with presence of moisture.

c. Analysis of substances.

Electrical equipment containing PCB insulating oils must be identified and appropriate actions taken to comply with 40 CFR 761. The identification process includes the taking of oil samples and submitting them to an analytical laboratory for identification and determination of concentration levels. Where electrical equipment is not marked or the type of

insulating

oil is not known, the equipment should be treated as if it is PCB contaminated and handled with similar precautions.

As with many organic chemical solvents, skin irritations may occur as a result of prolonged exposure. The following precautions are to be followed when handling askarel:

(1) Skin contact with the oil is to be avoided. Utilize neoprene gloves, sleeve guards, aprons, neoprene boots, eye goggles, or face shield.

(2) Heating of askarel is prohibited unless the system is entirely enclosed and vapor contact is controlled so there is no exposure to workers.

Samples of electrical insulating oils shall be obtained by the methods described in ASTM D 923-88, or other methods as mentioned by the ASTM. Testing for PCBs shall be as described by ASTM D 3304-77, and D 4059. Identification and classification of concentration requires the utmost in cleanliness and handling of the samples. Procedures outlined in the ASTM test procedures should be adhered to, not only for accuracy, but also to maintain a consistency in procedures should there be a large number of samples to be obtained.

d. Responsibilities.

The customer (generator of PCBs) shall determine the method of disposal, or have that duty designated to another responsible authority. The responsibility of disposal, until documents of final destruction are received, rests entirely upon the generator of the PCB! The generator's responsibility is not relinquished by delegation of duties or with the issuance of a disposal contract.

3. PCB Procedures for Projects.

a. Predesign conference.

On or before the predesign conference, the USACE Project Manager (PM), shall coordinate with the customer and determine if there are any items suspected of being PCB contaminated equipment, or PCB equipment (see definitions, attachment #2). If PCB is non-existent, it has to be indicated in the PM's pre-design conference minutes and no other PM action regarding PCBs is required. The designer (A-E or Inhouse) will then indicate in the design analysis that there are no PCBs in the project. If there is any suspect PCB contaminated equipment, the PM shall ask the customer what

type of services will be required to be performed by the A-E (to provide service to identify PCBs) and the construction contractor for PCB items including method of disposal. The agreed upon procedures for the PCB items shall be documented in a "Memorandum of Understanding". This Memorandum of Understanding shall be made part of the design analysis and made part of "Special Construction Concerns" forwarded to the Area/Resident Engineer.

b. Procedures for projects with PCBs.

The PM and the customer shall determine what needs to be done regarding the handling and disposal of PCB items on a project and the source of funds for design and construction. The PM and the project designer shall coordinate with the customer regarding the location(s) of items of suspect PCB equipment, PCB-contaminated equipment, and PCB equipment and clearly identify them on the project's plans and specifications. The customer shall be promptly notified in writing, by the Project Manager/designer, if leaking equipment is noticed during any site visits.

There are several combinations of efforts to be required by a construction contract for handling of PCBs on a given project. Several of the common options are as follows:

(1) No PCBs on the project: If there are no PCBs within the scope of the project or the customer will remove, take control, transport, and dispose equipment that contains PCBs, the designer shall include a statement in the design analysis indicating that there will be no requirement to handle PCBs and that the customer assumes sole responsibility for removal, transport, storage and disposal of such equipment. The installation must provide a letter stating that all PCBs have been removed and the site is clean.

(2) PCBs on the project; construction contractor to remove such equipment from service and have the customer remove the equipment from the jobsite: The contractor will be required to remove items suspected or known to contain PCBs out of service using procedures that meet the requirements of applicable regulations. After the equipment is out of service, the customer will handle all necessary reporting and disposal requirements. Testing, manifesting, etc. will be done by the customer. It may be necessary for the contractor to complete documentation to turn over the equipment to the customer. These requirements shall be determined and reflected in the

final
bidding documents. A Memorandum of Understanding regarding this matter must
be signed by the Project Manager and a representative of the customer. The
memorandum must indicate that the equipment will be transported off the
project site as soon as possible and no later than 48 hours after
removal from
service. PCB contaminated equipment, PCB equipment and suspect PCB
equipment
can only be stored temporarily for up to 30 days and stored for disposal
for
up to 1 year. These are LEGAL REQUIREMENTS. For the purposes of this
guide,
"removal" means "the time the equipment is disconnected from service."

(3) Construction contractor to remove, test, and transport the
equipment to a location designated by the customer to a location on the
Post/Base: The contractor will be required to remove items suspected or
known
to contain PCBs out of service using procedures that meet the
requirements of
applicable regulations. After the equipment is out of service, the
contractor
must test the fluid in the equipment to determine the concentration of
PCBs
within that equipment. The testing will be accomplished according to
the
appropriate ASTM test sampling and analysis methods. The customer must
make
any special requirements for testing or manifesting (amount of PCBs in
each
item of equipment, etc.) known and those requirements must be stated in
the bidding documents. After testing, the contractor will be required
to
transport the item(s) of PCB-containing equipment to a location
designated by
the customer. This location must be clearly identified in the bidding
documents. The customer will handle all necessary manifesting,
reporting, and
disposal requirements once the equipment has been turned over to the
customer.
It may be necessary for the contractor to complete documentation to turn
over
the equipment to the customer. These requirements need to be determined
and
reflected in the final bidding documents. A memorandum of understanding
regarding this matter must be signed by the Project Manager and a
representative of the customer.

(4) Construction contractor to remove, test, and dispose of the
equipment off of the Post/Base: The contractor will be required to
remove
items suspected or known to contain PCBs out of service using procedures
that
meet the requirements of applicable regulations. After the equipment is
out
of service, the contractor must test the fluid in the equipment to
determine
the concentration of PCBs within that equipment. The testing will be

required
to be according to the appropriate ASTM test sampling and analysis
methods.
After testing, the contractor will be required to transport the item(s)
of
PCB-containing equipment to a location off of the installation in
accordance
with all applicable regulations. The contractor shall also comply with
the
requirements described under "Manifest Requirements" and "Qualifications
of
Disposal Facility."

4. Bid Document Requirements.

The bid documents (plans and specifications) must clearly delineate
the
work that will be required to be performed for handling and disposing
PCBs on
a project. The plans must indicate the type of equipment, KVA, phase,
voltage
(primary and secondary, when applicable), equipment manufacturer, number
of
gallons of fluid or solid PCB, and any other pertinent information. The
fact
that regulations may require that certain procedures be followed is not
alone
sufficient for bidding purposes; statements within the specifications
are
necessary to require the contractor to comply with the applicable
regulations
(by accurate citation). Wherever possible, a description of the actual
work
required to be performed must be stated to preclude misunderstandings
and
claims during construction.

Following are recommended specification statements to be used as a
guide
for project specifications. Beware that regulations change and that
these
requirements must be verified by the designer/PM/customer for each
project.
The text of the regulations serving as the genesis for the stated
requirements
are reproduced here in small type for reference and information but are
not
intended to be literally a part of any final project specification.

a. PCB Testing.

The contractor shall submit a certificate of qualification of
the
testing laboratory for government approval. A certified copy of
qualifications shall be submitted to the government for approval no
later than
30 days before the schedule date of removal of the equipment.

Contract-required testing shall be performed no later than 48
hours

after removal from service of each item of equipment. Delay of testing for the purpose of group sampling (i.e. waiting for removal of other equipment) is not acceptable. The PCB test shall be per ASTM 3304-77 (Reapproved 1983) "Standard Method for Analysis of Environmental Materials for Polychlorinated Biphenyls" for air, water, soils, and sediments or per ASTM D 4059-86 "Standard Method for Analysis of Polychlorinated Biphenyls in Insulating Liquids by Gas Chromatography," for electrical insulating liquids. Samples for laboratory testing shall be per ASTM D 923-86 "Standard Methods of Sampling Electrical Insulating Liquids."

No other testing method shall be performed without the written approval of the Contracting Officer and EPA. Other testing methods not approved by the Contracting Officer and EPA will be considered as "not meeting the contract requirements" and be rendered unacceptable.

Results of the testing shall be available within 30 calendar days after removal. The result of the test shall be marked on each individual PCB equipment. Three copies of each test result shall be provided to the Contracting Officer as soon as the results of the tests are available.

When the tests are completed, the sample shall be disposed of properly per 40 CFR 761.65 (i) (4).

STORAGE, DISPOSAL AND HANDLING

The disposal of PCB-contaminated electrical equipment (with the liquids drained), solids (such as soil, rags and debris), or liquids other than mineral oil dielectric fluids which contain PCBs greater than 50 but less than 500 ppm (parts per million) shall be disposed of by:

1. Approved incinerator which complies with section 761.70.
2. Chemical waste landfill which complies with section 761.75.

Storage areas, prior to disposal, shall comply with section 761.40. The PCB articles and containers in storage shall be inspected at least once every 30 days. A Spill Prevention Control and Countermeasure (SPCC) Plan as described in Part 112, section 761.65 shall be prepared and implemented.

The disposal of PCB containers with PCB concentrations 500 ppm or greater, shall be disposed of by:

1. Incineration which complies with section 761.70.
2. Chemical waste landfill that complies with section 761.75, provided that the container must first be drained of the liquid PCBs,

and the
liquid disposed of in accordance with paragraph a of section 761.60.

An updated list of facilities approved by the EPA to dispose of PCB waste consisting of capacitors, properly drained transformers, contaminated soil, dirt, rags, asphalt, properly drained containers, and other debris is published in the Federal Register. For further information on the EPA approval of disposal facilities, contact the appropriate EPA Regional Office.

The method of disposal (either by contract or by government) is dependent upon many variables. The size of the item, quantities of items and/or volume of liquid, time constraints, permits, and availability of transportation. Whichever method is selected, by contractor or by government, legal responsibility for the disposal of the PCBs is the sole responsibility of the "generator" or original owner of the PCBs. Contracting for removal does not relieve the "generator" of the legal responsibility, but it places the liability of any accidental spill and clean-up upon the contractor. Therefore, selection of a disposal contractor should be based upon past record, performance, and reputation.

b. PCB Transportation.

Equipment containing PCBs shall be transported to [building #, Post/Base location] [temporary storage site as indicated] [off-site storage/off-site disposal location]. Transport of such equipment shall be per

CFR 40 CFR 761, U.S. Department of Transportation (DOT) hazardous materials regulations (49 CFR 171-177), and DOT motor carrier regulations (49 CFR 391).

Transport of laboratory sample(s) for testing and after testing shall comply with 49 CFR 173.345 and U.S. Postal Regulations 652.2 and 652.3. The sample shall include the following information:

(1) The sample collector's name mailing address, and telephone number

(2) The laboratory's name, mailing address, and telephone number

(3) The quantity of the sample

(4) The date of shipment

(5) A description of the sample.

The sample shall be packaged so it will not leak, spill or vaporize from its packaging.

Untested equipment shall be treated and handled as PCB-contaminated. Each transport vehicle shall be marked (see Fig 1) as if loaded with PCB containers, if the cargo contains more than 45 kg (99.4 lbs.) of PCBs in the liquid stage or with one or more PCB Transformers. Transport vehicles loaded with PCB items that contain more than 45 kg of liquid PCBs in concentrations of 50 ppm to 500 ppm shall be marked. Transport of PCBs equal to or greater than 4.5 kg and equal to or greater than 200 ppm shall be accompanied by DOT approved shipping papers (49 CFR 172, Subpart C). The shipping paper shall be with the driver during transport and preferably kept with the driver's side door container. The Contracting Officer, or his authorized representative, shall be provided a copy of the shipping papers not later than 10 working days before transport. The contractor shall make the necessary arrangement to the off-site storer or off-site disposer for the exact day of arrival of the PCB waste. If the PCB waste cannot be delivered, the contractor shall return the PCB waste to the Post/Base and redeliver as soon as possible at no extra cost to the government.

The carrier utilized for transportation of the PCB item(s) shall be experienced with the transportation of PCB item(s), and contractor shall show proof of transporter liability and capacity to provide adequate and rapid clean up of spills occurring during handling and transporting.

Contractor shall submit copies of the transporters "Bill of Lading" accompanied by proper state, federal and local permits prior to transporting the PCB item(s). A receiving and final disposition document shall be provided within 30 days upon receipt of permission to ship PCB item(s). Phone numbers, address and names of responsible parties involved shall be provided for all aspects of the transporting and disposal.

c. Transfer of item(s) of equipment to the customer.

Non-PCB equipment, suspect PCB equipment, PCB contaminated equipment, and PCB equipment shall be transported and turned in to the customer at the location indicated. [A completed DA Form 3161 Request for Issue or Turn-in shall be submitted to the customer together with the results of the

be dated on the articles when they are placed in storage, and should be managed so they can be located by the date they are put in storage. A record of the date and quantity added from a batch container shall be maintained. The record shall include the date, quantity, and disposition of any batch of PCBs removed from the container. Contractor shall establish and maintain records per 40 CFR 761.180. A current copy of the record shall be kept in the storage facility. Current records shall be made available to the government no later than 48 hours after request.

Any leaking PCB articles and their contents shall be transferred to properly marked non-leaking containers. A spill shall be cleaned up immediately using absorbents or other adequate means, and the PCB contaminated materials and residues shall be disposed of in accordance with 40 CFR 761.60(a)(4).

f. Spill response.

Contractor shall provide a ready crew for spill response. The ready crew shall respond as soon as possible and in no case later than 24 hours after discovery of PCB spill. A spill constitutes an illegal disposal and must be thoroughly and rapidly cleaned up.

PCB spill clean up shall be per 40 CFR 761.125. The Contracting Officer, or authorized representative, shall be notified if a spill has occurred as soon as possible and in no case later than 24 hours after discovery. U.S. National Response Center (NRC), telephone number 1-800-424-8802 (24 hours) shall be notified for any PCB spill that is 4.54 kg (10 lbs.) or more with concentration of 50 ppm or more. Other reporting requirements shall per 40 CFR 761.125 (a)(i) through (a)(iv). Disposal of clean-up debris shall be in accordance with the provisions of 40 CFR 761.60. At the completion of the clean up the contractor shall document the clean up with records and certification of decontamination. Information on the records and certifications shall be per 40 CFR 760.125. The contractor shall provide the contracting officer, or authorized representative, with a copy of the records and certifications. The records and certifications shall be maintained for five years. The clean up of the spill, records and certifications, transportation, and disposal of spill debris shall be at no extra cost to the government.

g. Manifest requirements.

Contractor shall prepare a manifest on EPA Form 8700-22 and a continuation sheet when necessary, for PCB waste stored off-site or disposed off-site. The contractor shall provide the information per 40 CFR 761.207 (a)(1) through (a)(3) and (g). When the state to which the shipment is manifested (consigned) to supplies and requires the manifest, the contractor shall use that state's manifest. When the state to which the shipment is manifested does not supply the manifest, the contractor shall use the state's manifest where the shipment is originated. If neither state supplies the manifest, the contractor may obtain the manifest from any source. Manifest is required for PCB waste that is subject to the disposal requirement of 40 CFR 761.60 including waste with PCB concentration below 50 ppm as a result of dilution. An example is spill cleanup material containing less than 50 ppm

h. Qualifications of disposal facility.
The disposal facility shall be an EPA approved facility. A copy of the current written certificate or letter of approval from EPA shall be submitted by the contractor for government approval. No disposal shall be initiated without the written approval of the contracting officer. The contractor shall make sure that the disposal facility will have a current EPA approval at the time of disposal. Disposal shall be per 40 CFR 761.60.

- Records on the disposition of PCBs and PCB items are required by the EPA for each facility using or storing (at one time) 99.4 pounds of PCBs contained in PCB containers or one or more PCB transformers, or 50 or more PCB large high-voltage capacitors. These records shall form the basis for an annual document prepared for each facility by July 1 covering the previous calendar year. Projects with one or more facilities that use or store PCBs and PCB items in the quantities stated above may maintain the records and documents at a facility that is normally occupied for 8-hours a day, provided the identity of this facility is available at each facility using or storing PCBs and PCB items. The records and documents shall be maintained for at least 5 years after the facility ceases using or storing PCBs and PCB items. The records shall be maintained and established as provided in section 761.180, with the following information for each facility included in the annual document:

PCBs

contained in the transformers.

3. Total number of PCB large (greater than 3 lbs dielectric fluid) high- or low-voltage capacitors.

For PCBs and PCB items removed from service, the location of the initial disposal or storage facility, name of the owner or operator of the facility, and the date on which the article or container was removed from service shall be documented.

Total quantities of PCBs and PCB items remaining in service at the end of the calendar year using the following breakdown:

1. Total weight of PCBs and PCB items in PCB containers, including the identification of container contents, such as liquids and capacitors.

2. Total number of PCB transformers and total weight of any PCBs contained in the transformer.

3. Total number of PCB large high- or low-voltage capacitor

i. Maintenance of data and records.

Data and records shall be per 40 CFR 761.70. All data and records required by 40 CFR 761.70 shall be maintained in accordance with 40 CFR 761.180. The contractor shall make available the records when requested by the government no later than 7 working days after request. An itemized record of destruction or disposal shall be submitted to the government no later than 30 days after PCB destruction or disposal. The itemized record of destruction shall include contract number of the project, project name, location and specification number. The record shall indicate where (disposal facility name and address) the PCBs removed from this project have been disposed of, date, principal (disposal facility owner), and telephone number, in accordance with 40 CFR 761.60.

Bibliography:

Code of Federal Regulations, Title 40, Part 761
PCB Disposal Manual, Electrical Power Research Institute (EPPRI),
SCS Engineers Inc., June 1985.
Shipboard Hazardous Material/Hazardous Waste Training Manual,
U.S. Navy, March 1984.

LIST OF PCB TRADEMARKS
(PARTIAL LISTINGS)

Trade Name	Manufacturer
Aroclor/Askarel*	Monsanto
Asbestol*	American Corporation
Askarel*	Ferranti-Packard Ltd.
Askarel*	Hevi-Duty Electric
Askarel*	R.C. Uptegraft Manufacturing
Co.	
Askarel*, EEC-18	Niagara Transformer Co.
Chlorextol	Allis Chalmers
Clopen	Bayer (Germany)
CK	Caffaro (Italy)
Diaclor	Sangamo Electric
Dykanol	Cornell Dubilier
EED-18	Power Zone Transformer
Elemex	Mcgraw Edison
Fenclor	Caffaro (Italy)
Hyvol	Aerowax
Inerteen	Westinghouse Electric
Kennechlor	Mitsubishi (Japan)
No-Flamol	Wagnor Electric
Non-Flammable Liquid	ITE Circuit Breaker Co.
Phenoclor	Prodelec (France)

Pyralene
Pyranol
Saf-T-Kuhl
Santotherm

Prodelec (France)
General Electric
Kulhman Electric
Mitsubishi (Japan)

Note: * Indicates generic name of PCBs.

DEFINITIONS

PCB and PCBs - Any chemical substance that is limited to the biphenyl molecule that has been chlorinated to varying degrees and any combination of substances which contains such substance.

Manifest - The shipping document EPA Form 8700-22 and any continuation sheet

attached to EPA form 8700-22

PCB Article - Any manufactured article, other than a PCB Container, that contains PCBs and whose surface(s) has been in direct contact with PCBs.

PCB Article Container - means any package, can, bottle, bag, barrel, drum, tank, or other device used to contain PCB Articles or PCB Equipment, and whose surface(s) has not been in direct contact with PCBs.

PCB Container - Any package, can, bottle, bag, drum, barrel, drum, tank, or other device that contains PCBs or PCB Articles and whose surface(s) has been in direct contact with PCBs.

PCB Equipment - Any manufactured item, other than a PCB Container or a PCB Article Container, which contains a PCB Article or other PCB Equipment, and includes microwave ovens, electronic equipment, and fluorescent light ballasts and fixtures.

PCB Item - Any PCB Article, PCB Article container, PCB Container, or PCB Equipment, that deliberately or unintentionally contains or has a part of it any PCB or PCBs.

PCB Transformer - Any transformer that contains 500 ppm PCB or greater.

PCB-Contaminated Electrical Equipment - Any electrical equipment, including but not limited to transformers (including those used in railway locomotives and self propelled cars), capacitors, circuit breakers, reclosers, voltage regulators, switches (including sectionalizers and motor starters), electromagnets, and cable, that contain 50 ppm or greater PCB, but less than 500 ppm. Oil-filled electrical equipment other than circuit breakers,

reclosers, and cables whose PCB concentration is unknown must be assumed to be
PCB-Contaminated Electrical Equipment.

PCB waste(s) - those PCBs and PCB Items that are subject to the disposal requirement of 40 CFR s 761.